

REMARKS

Applicant submits that the present application, as currently amended, is in condition for allowance.

Claims 13 and 16 are pending, with claims 13 and 16 amended and claims 1-12 and 14-15 canceled without prejudice or disclaimer.

Claim 13 is amended to more clearly describe and distinctly claim Applicant's invention. Support for this amendment is found in Applicant's originally filed specification.¹ No new matter is added.

Briefly recapitulating, amended claim 13 is directed to

A method of generating a pattern constructed by more than 3 basic colors to acquire 3D color information, wherein a common light source and a pattern light source are used to respectively acquire a projected image and a pattern image to obtain a 3D model of an object, wherein the pattern light source provides the pattern constructed by more than 3 basic colors, comprising:

(a) selecting a primary encoding unit including a predetermined number of colors;

(b) adding a first of the more than 3 basic colors behind the primary encoding unit to form a first new encoding unit;

(c) confirming that an arrangement of the first new encoding unit follows a predetermined color sequence of adjacent colors;

(d) determining whether or not the first new encoding unit corresponds to any previous encoding unit;

(e) one of

(e1) if the first new encoding unit corresponds to any previous encoding unit, adding a second of the more than 3 basic colors behind the primary encoding unit to form a second new encoding unit and repeating

¹ Specification, Figure 2

steps (c) and (d) until step (d) identifies a final new encoding unit that does not correspond to any previous encoding unit, and

(e2) if the first new encoding unit does not correspond to any previous encoding unit, identifying the first new encoding unit as the final new encoding unit;

(f) determining whether or not the final new encoding unit can be associated with a pre-existing cluster in accordance with a predetermined association parameter;

(g) one of

(g1) forming a new cluster if the final new encoding unit cannot be associated with a pre-existing cluster,

(g2) assigning the final new encoding unit to the pre-existing cluster if the final new encoding unit can be associated with a pre-existing cluster, and if the final new encoding unit is spaced from pre-existing encoding units of the pre-existing cluster by a predetermined amount, and

(g3) if the final new encoding unit can be associated with a pre-existing cluster, and if the final new encoding unit is not spaced from pre-existing encoding units of the pre-existing cluster by a predetermined amount, repeating steps (a) through (f) with another of the more than 3 basic colors; and

(h) repeating the steps (a) through (g) until all of the more than 3 basic colors are processed.

Chang describes a sequence of patterns of light symbols that temporally encode two-dimensional position information in a projection plane with unique light symbol sequence codes is projected onto a scene. *At least two light patterns encode position information at different spatial resolutions.* Light patterns reflected from the scene are captured at a capture plane. A correspondence mapping between the capture plane and the projection plane is computed based at least in part on correspondence between light symbol sequence codes captured at the capture plane and light symbol sequence codes projected from the projection plane.

In another embodiment, Chang describes a first light pattern is projected onto a scene. Light patterns reflected from the scene are captured at a capture plane. A coarse correspondence mapping between the capture plane and a reference plane is computed based at least in part on the captured light patterns. One or more undersampled regions of the scene are identified based at least in part on the computed coarse correspondence mapping. A second light pattern different from the first light pattern is projected onto the undersampled regions of the scene. *A refined correspondence mapping between the capture plane and the reference plane is computed based at least in part on the light patterns captured during projection of the second light pattern.*

In particular, Fig. 6 of Chang describes a method of base-4 encoding that includes different colors (e.g., white 52, red 54, green 56, and blue 58) to encode both vertical and horizontal positions simultaneously. In this manner, only N base-4 images are required, where $N = \log_4(w \times h)$. An exemplary pattern is shown in FIG. 6 for an 8×8 reference grid. The upper left location in the reference grid consists of (white, white, white, white, white, white) for the base-2 encoding of FIG. 3 and (white, white, white) for the base-4 encoding of FIG. 6. The location immediately to its right in the projection plane is (white, white, white, white, white, black) for base-2 and (white, white, red) in the base-4 encoding, and so forth for other locations. In this embodiment, reference patterns consist of all white, all red, all green, and all blue patterns.

Chang also describes, that to overcome decoding errors, error resiliency may be incorporated into the light patterns so that the transmitted light patterns may be decoded properly. While adding error resiliency will require additional patterns to be displayed and hence reduce the speed of the capture process, it will improve the overall robustness of the system. For

example, in some embodiments of Chang, various conventional error protection techniques (e.g. pattern replication, (7, 4) Hamming codes, soft decoding, other error control codes) may be used to protect the bits associated with the higher spatial frequency patterns and help to recover single bit errors.

However, Chang does not disclose or suggest the color sequence processing recited in amended claim 13. MPEP § 2131 notes that “[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). See also MPEP § 2131.02. “The identical invention must be shown in as complete detail as is contained in the ... claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). Because Chang does not disclose or suggest all of the features recited in claim 13, Chang does not anticipate the invention recited in claim 13, and all claims depending therefrom.

Conclusion

In view of the above remarks, it is believed that claims are allowable.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Michael Monaco, Reg. No. 52,041 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

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Respectfully submitted,

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